

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
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In the Matter of

Amendment of Parts 2, 25 and 97
Of the Commission's Rules with Regard to
Mobile-Satellite Service Above 1 GHz

ET Docket No. 98-142

**CONSOLIDATED REPLY COMMENTS
OF ICO SERVICES LIMITED**

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To the Commission:

**CONSOLIDATED REPLY COMMENTS
OF ICO SERVICES LIMITED**

ICO Services Limited ("ICO")¹ hereby submits its consolidated reply to comments submitted September 21, 1998 in response to the Federal Communications Commission's ("FCC" or "Commission") Notice of Proposed Rule Making ("NPRM") in the above-referenced proceeding.²

¹ ICO Services Limited, a company established under the laws of England and Wales, is a wholly owned subsidiary of ICO Global Communications (Holding) Limited, which is the ultimate parent of a wholly owned group of companies (referred to herein collectively as "ICO") that is developing a global mobile satellite service ("MSS") system. Specifically, the ICO global MSS system, which expects to begin operation in 2000, will use radio frequencies at 5150-5250 MHz for its Earth-to-space feeder links and at 6975-7075 MHz for its space-to-Earth feeder links.

² *Amendment of Parts 2, 25 and 97 of the Commission's Rules with Regard to Mobile-Satellite Service Above 1 GHz*, Notice of Proposed Rule Making. ET Docket No. 98-142, FCC No. 98-177 (Aug. 4, 1998) ("NPRM").

I. INTRODUCTION AND SUMMARY

The vast majority of commenters support the Commission's proposal to amend Part 2 of the Commission's rules by allocating the 5091-5250 MHz frequency band on a co-primary basis for Earth-to-space fixed-satellite service ("FSS") and the 6700-7075 MHz frequency band on a co-primary basis for space-to-Earth FSS for use in the provision of feeder links to non-geostationary satellite orbit ("NGSO") MSS systems in accordance with relevant International Telecommunication Union ("ITU") World Radio Conferences ("WRC") frequency allocations.³ Mobile Communications Holdings, Inc., Constellation Communications, Inc., L.Q. Licensee, Inc., Globalstar, L.P., and AirTouch Communications, Inc., support the Commission's proposals to implement the technical standards adopted by the ITU for the 5/7 GHz frequency bands.⁴ Although trade associations, representing the interests of existing and potential FSS and broadcast auxiliary services ("BAS") terrestrial licensees, and a digital audio radio service ("DARS") licensee do not oppose the FCC's proposal to allocate the referenced bands at 5/7 GHz for use by NGSO MSS feeder links, they raise concerns with respect to frequency coordination and other technical issues. As discussed below, these concerns are adequately addressed by the Commission's proposals and existing international regulations. Because the Commission's proposals regarding the frequency allocations are

³ See Comments of Fixed Point-to-Point Communications Section, Network Equipment Division, Telecommunications Industry Association ("TIA Comments"); Comments of Society of Broadcast Engineers, Inc. ("SBE Comments"); Comments of UTC ("UTC Comments"); Comments of CD Radio, Inc. ("CD Radio Comments"); Comments of Constellation Communications, Inc. ("Constellation Comments"); Comments of Mobile Communications Holdings, Inc., ("MCHI Comments"); Joint Comments of L/Q Licensee, Inc., Globalstar, L.P., and AirTouch Communications, Inc. ("Globalstar Comments").

⁴ Globalstar Comments at 3; Constellation Comments at 2; MCHI Comments at 1-2.

consistent with U.S. international commitments made at recent ITU WRCs, the Commission should reject any recommendations that deviate from those commitments.

II. FIXED SERVICE COMMENTERS' CONCERNS REGARDING THE 7 GHZ BAND FREQUENCIES ARE WITHOUT MERIT AND SHOULD BE DISMISSED

The technical issues raised by the Fixed Point-to-Point Communications Section, Network Equipment Division, Telecommunications Industry Association ("TIA") and UTC addressing the use of the 6700-6875 MHz frequency bands by NGSO MSS feeder link downlink emissions are fully and adequately addressed in the Commission's proposed rules. ICO acknowledges that the upper 6 GHz range (6525-6875 MHz) serves as an important frequency band for U.S. fixed service ("FS") operators, including those FS systems that may be transitioned from lower frequency bands (*e.g.*, the 2 GHz frequency range) and that FS operators would like reasonable security for their operations. TIA's and UTC's concerns, however, focus on ensuring adequate protection for FS systems and proper application of coordination procedures in the 6700-6875 MHz range in which U.S. FS stations operate, but which will not be occupied by first generation NGSO MSS systems.⁵

A. WRC-95 and WRC-97 Participants Agreed Upon NGSO MSS 7 GHz PFD Limits That Are Adequate To Protect FS Operators

TIA's assertion that the proposed NGSO MSS power flux density ("PFD") limits would not protect FS receive stations is incorrect.⁶ As ICO pointed out in its initial comments, PFD limits for the 6700-7075 frequency bands were adopted with

⁵ TIA Comments at 2-7; UTC Comments at 2-3; *see infra* p. 8 and note 16. Reply Comments of the American Petroleum Institute raise similar issues, but they, too, focus on the upper 6 GHz frequency band (6525-6875 MHz) which is below the range that first generation NGSO MSS systems will occupy.

⁶ TIA Comments at 4-6

international agreement at WRC-95 and incorporated into the Radio Regulations.⁷ The WRC-97 subsequently confirmed that those PFD limits will continue to apply. Neither TIA nor UTC apparently raised any concerns during the WRC-95 and WRC-97 deliberations regarding the PFD limits developed to protect upper 6 GHz FS systems, and the U.S. administration delegation fully supported the agreed upon PFD limits at both WRC-95 and WRC-97.

Indeed, prior to the adoption of PFD limits at WRC-95, ITU-R Working Party 4-9/S and other groups exhaustively studied PFD limits in order to ensure reasonable protection of Fixed Services in the 6-7 GHz range. The recently adopted ITU-R Recommendation SF.1320 ("Recommendation") delineates PFD limits in various space-to-Earth bands allocated for use by NGSO FSS or NGSO MSS feeder links.⁸ In the 6700-7075 MHz band, the PFD limits set forth in the Recommendation on FSS feeder link bands for use by NGSO MSS systems are identical to those set forth in the ITU Radio Regulations. The U.S. administration actively supported adoption of the Recommendation.

⁷ ICO Comments at 3 n.7 (citing *Final Acts of the World Radiocommunication Conference Geneva, 1997*, Annex 2 to Resolution 46/Rev. WRC-97 (now re-numbered as No. S9.11A)).

⁸ ITU, [SF.1320] *Maximum allowable values of power flux-density at the surface of the Earth produced by non-geostationary satellites in the fixed-satellite service used in feeder links for the mobile-satellite service and sharing the same frequency bands with radio-relay systems* (1997); ITU, [4-9S/29] *Liaison statement to Working Party 4-9S - GSO and non-GSO FSS characteristics for sharing studies with the FS in the bands 6 - 7 GHz and 4 - 5 GHz, 14 - 15 GHz and 11 - 13 GHz, 30/20 GHz and above 30 GHz* (1997). These studies were based on a showing that NGSO MSS space station emissions, if constrained to certain PFDs, would not give rise to a given agreed fractional degradation in performance ("FDP") for a given reference digital FS system located at a specific latitude and orientated at the worst possible pointing azimuth. The calculation of FDP is in effect a time-average I/N ratio taking into account the NGSO MSS constellation orbital

ICO fully supports the Commission's conclusion that the proposed adoption of internationally accepted PFD limits for NGSO MSS feeder links protects existing and planned U.S. 6 GHz FS links. In addition, various NGSO MSS systems (*e.g.*, Globalstar and ICO) already have had Appendix 3 Requests for Coordination Information published by the ITU Radiocommunication Bureau ("RB") for operation within various segments of the 6700-7075 MHz band. Subsequently, these NGSO MSS filings received favorable PFD limit compliance findings from the RB.⁹ The ITU and the RB cannot retroactively change their findings. To re-open the internationally adopted PFD limits adopted in Article S9.11A not only is impractical, it is unwarranted.

B. TIA's Concerns Regarding Coordination Constraints For FS Stations With NGSO MSS Feeder Link Earth Stations Are Unfounded

TIA's assertion that the operation of NGSO MSS feeder link earth stations (or gateways) can place significant constraints on the deployment of existing and planned FS stations is misplaced. Accordingly TIA's recommendations should be dismissed.¹⁰

TIA assumes that all MSS feeder link gateway stations will be located near population centers and argues, *inter alia*, that: (a) NGSO MSS feeder link systems must not cause "objectionable" interference to existing or pre-coordinated terrestrial FS radio systems; (b) the FCC should adopt interference criteria set forth in 47 C.F.R. Section 101.105 to protect FS stations; and (c) that applicants for NGSO MSS feeder links "must

dynamics and thus the visibility statistics of NGSO constellations as seen by a given receiving FS station.

⁹ ITU Radiocommunication Bureau Weekly Circular 2291, Special Section No. RES46/C/167 MOD-1, Aug. 19, 1997 (Advance Publication ICO-P); ITU Radiocommunication Bureau Weekly Circular 2281, Special Section No. RES46/C/182, June 10, 1997 (Advance Publication Globalstar HIBLEO-4FL).

¹⁰ TIA Comments at 7.

apply for and be authorized only for the bandwidth and are required for immediate use plus an additional amount not to exceed 50% of that needed for immediate use, and to justify the bandwidth requested.”¹¹

TIA’s assumptions that NGSO MSS feeder link earth stations will have an “enormous impact” on terrestrial microwave systems and that MSS feeder link gateway stations will be near population centers are erroneous. First, NGSO MSS feeder link earth station applicants seeking to operate within existing FS link assignments must coordinate with the relevant existing FS stations in accordance with FCC rules.¹² To date, to ICO’s knowledge, NGSO MSS operators seeking feeder link earth station authorizations from the FCC have not identified any significant difficulties in coordination with existing FS links.

Second, TIA’s assumption that MSS feeder link gateway stations will locate near population centers is not well founded. MSS operators, like ICO, attempting to minimize frequency coordination issues, generally have sited feeder link earth stations away from major population centers, unless operational priorities require otherwise.¹³ ICO intends to operate one U.S. gateway station in Brewster, Washington, a remote area of Washington State.

Third, the 7 GHz band is not likely to face now or in the future any serious proliferation of gateway or feeder link earth stations, as evidenced by Big LEO licensees’

¹¹ TIA Comments at 7-8.

¹² 47 C.F.R. §25.203 (choice of sites and frequencies).

¹³ ICO’s single U.S. gateway is located in Brewster, Washington, a town of about 2,050 in Washington State’s remote Okanogan County. See, e.g., File No. 1349-DSE-P/L-97 E970374 et al.; Constellation Comments at 3 (plans to locate gateway earth stations in rural areas).

responses to the FCC in this proceeding. The Big LFO MSS licensees operating in the United States 7 GHz band are likely to operate no more than six gateways per MSS operator.¹⁴ In addition, MSS gateway earth stations require relatively large apertures (7.6 meters in the case of ICO's Brewster site) because they must be capable of handling a large fraction of the satellite's full traffic capacity, while conforming with the ITU's stringent PFD limits on the satellite downlink emissions at 7 GHz. As such, these major gateway earth stations facilities are very costly to build and operate and MSS operators, like ICO, seek to design their satellite systems to minimize the number required.

Moreover, as shown above, assuming the relevant PFD limits are met, NGSO MSS feeder links emissions will not cause unacceptable interference to FS links. Therefore, ICO does not concur with the TIA proposal "(a)"--that NGSO MSS feeder link systems must not cause "objectionable" interference to existing or pre-coordinated terrestrial FS radio systems.

ICO also opposes TIA proposal "(b)"--that the FCC adopt the criteria set forth in Section 101.105 for protection of FS stations. The criteria in this Section do not apply to circumstances involving MSS operations.¹⁵

¹⁴ Constellation Comments at 3-4; MCHI Comments at 5; *NPRM* at ¶22.

¹⁵ 47 C.F.R. §101.105.

Finally, ICO also opposes the TIA proposal "(c)" -- that applicants for NGSO MSS feeder links "must apply for and be authorized for the bandwidth and arc required for immediate use . . . and to justify the bandwidth requested." This approach is unacceptably onerous for MSS systems. First, the commercial nature of MSS systems requires MSS systems to implement facilities, such as earth stations, to accommodate growth in traffic requirements (and associated bandwidth) over a period of time consistent with the lifetime at least of one or two generations of space-segment. An arbitrary limit on bandwidth access for feeder link earth stations to 'immediate use' would clearly be unacceptable. Second, NGSO MSS feeder link earth stations, in general, require access to the entire frequency range of the associated MSS feeder link space station. MSS system design and inter-satellite coordination generally require that NGSO MSS feeder links operate across the filed bandwidth for the NGSO MSS system.

C. FS Operators' Use of the 6700-6875 MHz Frequencies Will Be Unconstrained

Feeder links for all first generation 7 GHz range NGSO MSS systems will operate above 6875 MHz in the downlink.¹⁶ Moreover, due to the immense financial investment required, it is unlikely that any new NGSO MSS system, that is not already licensed or has not yet applied for U.S. authorization to use the 7 GHz bands, will emerge in the near to medium term. Accordingly, the U.S. FS operators effectively will be completely or largely unconstrained in their use of the 6700-6875 MHz bands. In addition, new FS stations operating in the 6700-6875 MHz frequency range likely can be coordinated and

¹⁶ Constellation Comments at 1 (downlink--6875-7025 MHz); Globalstar Comments at 2 (downlink--6875-7055 MHz); ICO Comments at 2 (downlink--6975-7075 MHz); MCHI Comments at 2 (downlink--6875-7075 MHz).

authorized by the Commission with no constraints with regard to already planned NGSO MSS feeder link earth stations for the above-referenced NGSO MSS systems.

Any existing NGSO MSS system is not likely to seek to operate new NGSO MSS feeder link earth stations with frequencies in the 6700-6875 MHz range until the medium to long term, at which time such applicants will be required to coordinate and protect existing FS stations or FS stations already in coordination. In effect, this means that the new NGSO MSS feeder link earth stations will most likely be located in geographical areas where coordination with FS stations can be achieved with minimum constraint. These feeder link stations also may be able to undertake certain operational constraints at their present locations or in locations near existing FS stations to facilitate coordination.

III. SBE'S PROPOSAL FOR EXCLUSION AREAS AROUND BAS MARKETS IS ONEROUS AND UNNECESSARY

SBE agrees that the Commission's proposal to adopt the international ITU PFD limits for NGSO MSS feeder link stations in the 6875-7075 MHz range would fully protect BAS stations operating in the 7 GHz frequency range.¹⁷

However, SBE's proposal to exclude siting of NGSO MSS feeder link earth stations 100 kilometers outside the top BAS markets would place unacceptable and unnecessary constraints on MSS operators.¹⁸ The BAS proposal effectively eliminates approximately three million square kilometers of United States territory from potential use by NGSO MSS feeder link earth stations. This exclusion area represents almost a

¹⁷ SBE Comments at 3.

¹⁸ SBE Comments at 2.

third of the total surface area of the United States (around 9 million square kilometers).¹⁹ Such a constraint is unnecessary and punitive.

Moreover, because feeder link earth stations for NGSO MSS systems are subject to interference from BAS transmit stations, it would be in the MSS operators' interest to locate feeder link earth stations at sites away from urban areas to minimize the likelihood of harmful interference to MSS operations. Because NGSO MSS and BAS systems will access the 7 GHz frequency bands on a co-primary basis, they have a mutual obligation to avoid interference, and coordination of BAS transmit sites with NGSO MSS feeder link earth station receive sites can be achieved through the use of respective frequency coordinators. ICO urges the FCC to dismiss SBE's proposal.

IV. GSO DARS SATELLITES WILL BE ADEQUATELY PROTECTED AND COORDINATION BETWEEN CD RADIO DARS EARTH STATIONS AND MSS GATEWAYS SHOULD BE FEASIBLE

The concerns raised by Satellite CD Radio, Inc. ("CD Radio") regarding the use of the 7025-7075 MHz band by NGSO MSS feeder links are not well founded.²⁰

First, CD Radio expresses concern about interference from NGSO MSS satellite emissions in the 7025-7075 MHz band to geostationary ("GSO") DARS satellite receivers, and states correctly that NGSO MSS operators must show that the PFD from

¹⁹ Rand McNally, Atlas of the United States 131 (1983).

²⁰ CD Radio Comments at 2.

their satellites meets the relevant ITU PFD limits at the GSO orbit. In fact, the ITU RB will in any event separately undertake this assessment based on the relevant ITU filed Appendix 3 request for information for the NGSO MSS feeder links at 7 GHz. The ITU RB has determined that relevant U.S. licensed Big LEO NGSO systems, specifically Globalstar, planning feeder links in the 7025-7075 MHz range, as well as ICO, comply with the relevant PFD limits at the GSO orbit. ICO considers that such an assessment, if necessary, may be undertaken for U.S. licensed NGSO MSS systems by the Commission using ITU-R Recommendation S. 1256.²¹

Second, CD Radio suggests that coordination of DARS feeder uplink stations should not be constrained.²² CD Radio apparently plans only two DARS feeder link earth stations in the contiguous United States ("CONUS"), while each NGSO MSS system likely will have no more than six feeder link stations within CONUS. Accordingly, with careful site selection within CONUS and application of established Commission frequency coordination procedures, coordination between DARS feeder uplink earth stations and MSS feeder downlink earth stations will be feasible.

V. OTHER COMMENTS

ICO agrees with Globalstar that the Commission should facilitate the flexible application of coordination procedures to accommodate multiple NGSO MSS systems in the 5/7 GHz bands.²³ ICO also supports Globalstar's and Constellation's comments

²¹ ITU, [S.1256] *Methodology for determining the maximum aggregate power flux-density at the geostationary-satellite orbit in the band 6700 - 7075 MHz from feeder links of non-geostationary satellite systems in the mobile-satellite service in the space-to-Earth direction* (1997).

²² CD Radio Comments at 1-2.

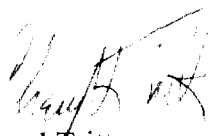
²³ Globalstar Comments at 3-4.

regarding Differential-Global-Positioning-System implementation and, in principle, supports the proposal for modification of footnote G126.²⁴

CONCLUSION

For the foregoing reasons, ICO urges the Commission to adopt expeditiously its proposals to allocate domestically feeder links in the 5/7 MHz frequency bands as consistent with U.S. international commitments and to reject any recommendations that deviate from those commitments.

Respectfully submitted,



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October 13, 1998

²⁴ Constellation Comments at 3; Globalstar Comments at 4-5.

CERTIFICATE OF SERVICE

I, James Bucholz, hereby certify that copies of the foregoing CONSOLIDATED
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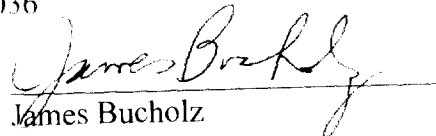
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